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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,315	04/26/2001	Taketomi Asami	0756-2306	5664

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EXAMINER

BLUM, DAVID S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 07/29/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant(s)

09/842,315

Applicant(s)

ASAMI ET AL.

Examiner

David S Blum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 recite the limitation "the atmosphere" in the last two lines of each claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teramoto (US 5,773,325) in view of Varhue (US 6,313,017) and Lampert (US 5,181,985).

Teramoto teaches all of the positive steps of claims 1-12 except for in-situ cleaning of the semiconductor film. Teramoto teaches forming an amorphous silicon film (304) on a base film, the amorphous film is recrystallized and patterned (thus forming an island shape), and forming a gate insulating film (305) on the crystalline film.

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Varhue teaches that silicon films and substrates must be cleaned of contamination impurities (cleaning or removing material is etching) and does this in an acid containing fluorine and preferably (in-situ) in a load-lock chamber which will avoid exposure to the (clean room) atmosphere and allow the next layer to be formed (column 5 lines 10-25). Varhue also teaches that if the film is exposed to oxygen atmosphere, it must be recleaned (in-situ) prior to forming the next layer.

The examiner goes on the record stating that it is known in the art to use ozone to alter a surface from hydrophobic to hydrophilic and one skilled in the art would know to do this to improve the cleaning process. This statement was not traversed and is therefore accepted as fact by the applicant. Lampert rinses wafer surfaces with pure water containing ozone (column 2 line 56). Lampert teaches impurities must be removed to improve CVD oxidation, epi and polysilicon deposition.

Neither Varhue nor Lambert recite which impurities are removed by their cleaning process. The applicant, on page 2, first paragraph of the summary of the invention, states that semiconductor devices are usually produced in clean rooms, but that filters generate impurities (particularly boron) and part of operation. Therefore it is intrinsic to semiconductor fabrication that boron is one of the impurity contaminants on a substrate. Further, the applicant states that if a human being is in the clean room (conventional practice), sodium will be a common impurity contaminant. As Varhue and Lampert teach cleaning the substrate by the same process as the applicant, and boron and sodium are

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intrinsically contaminate the substrate, it is obvious that the same chemicals would remove these impurities from the substrate in Varhue and Lampert as in the instant application (claims 13-15).

One skilled in the requisite art at the time of the invention would modify Teramoto by including cleaning the film surface as suggested by Varhue (to be a standard semiconductor procedure) and to include modifying the surface by rinsing with ozone/water as suggested by Lampert (to be a standard semiconductor procedure) with reasonable expectation of producing a device without unwanted impurities (Teramoto column 4 lines 19-21, Varhue column 5 lines 10-12, Lampert Background).

Response to Arguments

5. Applicant's arguments filed 6/6/02 have been fully considered but they are not persuasive.

The applicant argues that one in the art would know what "the atmosphere" refers to in claims 1-4, and therefore the 112 rejection should be withdrawn. However, there is an atmosphere in the chamber, another in the clean room, and another outside the clean room. Without an antecedent basis, it would not be clear what "the atmosphere" refers to.

The applicant also argues that there is no prima facie case of obviousness because there is no motivation to combine the references. However, Varhue and Lampert teach

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that it is necessary to clean substrates and keep them out of contaminating atmospheres in order to fabricate on them. These are general teachings and the references themselves teach the motivation to combine, that is without cleaning and avoiding contaminating atmospheres, the devices may not operate properly. Varhue stresses this by teaching that if a clean substrate is placed in the room atmosphere, it must be cleaned again prior to subsequent fabrication steps.

The applicant also argues that none of the references teach using washing with pure water or with fluorine to remove impurities such as B, Na, K, Mg, and Ca. However, the applicant teaches that B and Na are present contaminants do to the conventional process setup and as Varhue and Lampert teach using washing with pure water or with fluorine to remove impurities, they must be removing B and Na as part of the impurities even if they are not aware of it.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Blum whose telephone number is (703)-306-9168 and e-mail address is David.blum@USPTO.gov.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached at (703)-306-2794. Our facsimile number for Before-Final Communications is (703)- 308-7722 and for After-Final Communications is (703)- 872-9319. Our receptionist's number is (703)-308-0956.

David S. Blum

July 24, 2002


OLIK CHAUDHURI
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